National Institute of Environmental Health Sciences

Daily average temperature and mortality among the elderly: A meta-analysis and systematic review of epidemiological evidence

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Abstract:

The impact of climate change on the health of vulnerable groups such as the elderly has been of increasing concern. However, to date there has been no meta-analysis of current literature relating to the effects of temperature fluctuations upon mortality amongst the elderly. We synthesised risk estimates of the overall impact of daily mean temperature on elderly mortality across different continents. A comprehensive literature search was conducted using MEDLINE and PubMed to identify papers published up to December 2010. Selection criteria including suitable temperature indicators, endpoints, study-designs and identification of threshold were used. A two-stage Bayesian hierarchical model was performed to summarise the percent increase in mortality with a 1 degrees C temperature increase (or decrease) with 95% confidence intervals in hot (or cold) days, with lagged effects also measured. Fifteen studies met the eligibility criteria and almost 13 million elderly deaths were included in this meta-analysis. In total, there was a 2-5% increase for a 1 degrees C increment during hot temperature intervals, and a 1-2 % increase in all-cause mortality for a 1 degrees C decrease during cold temperature intervals. Lags of up to 9 days in exposure to cold temperature intervals were substantially associated with all-cause mortality, but no substantial lagged effects were observed for hot intervals. Thus, both hot and cold temperatures substantially increased mortality among the elderly, but the magnitude of heat-related effects seemed to be larger than that of cold effects within a global context.

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Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Temperature

Temperature: Extreme Cold, Extreme Heat

Geographic Feature:

resource focuses on specific type of geography

None or Unspecified

Geographic Location:

resource focuses on specific location

Global or Unspecified

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Injury

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Population of Concern: A focus of content

Population of Concern: ☑

populations at particular risk or vulnerability to climate change impacts

Elderly

Resource Type: ☑

format or standard characteristic of resource

Review, Review

Timescale: ☑

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content